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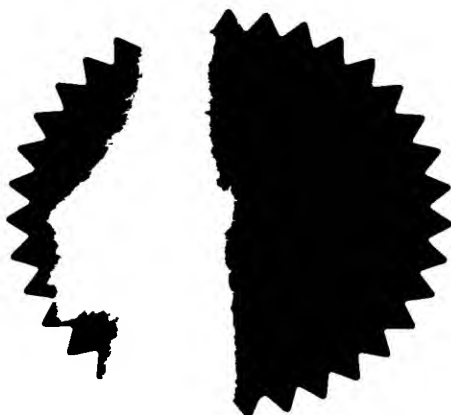
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*Stephen Hordley*

Dated 7 May 2003





## Patents Form 1/77

Patents Act 1977  
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THE PATENT OFFICE

28OCT02 E758825-1.006223  
P01/7700.0.00-0224955.5

## Request for grant of a patent 28 OCT 2002

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## 1. Your reference

P-UK-CS11144

2. Patent application number  
(The Patent Office will fill in this part)

0224955.5

28 OCT 2002

## 3. Full name, address and postcode of the or of each applicant (underline all surnames)

BLACK & DECKER INC  
DRUMMOND PLAZA OFFICE PARK  
1423 KIRKWOOD HIGHWAY  
NEWARK, DELAWARE USA

Patents ADP number (if you know it)

341 214004

If the applicant is a corporate body, give the country/state of its incorporation

DELAWARE, USA

## 4. Title of the invention

HANDLE ASSEMBLY FOR TOOL

## 5. Name of your agent (if you have one)

SHAYA, D M; BELL, I S; CAVALIER, M A M;

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

BLACK & DECKER  
PATENT DEPARTMENT  
210 BATH ROAD  
SLOUGH  
BERKS SL1 3YD  
United Kingdom

Patents ADP number (if you know it)

8130148001

## 6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

## 7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

## 8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

YES

- a) any applicant named in part 3 is not an inventor, or  
b) there is an inventor who is not named as an applicant, or  
c) any named applicant is a corporate body.  
See note (d))

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Continuation sheets of this form	0
Description	6
Claim(s)	2
Abstract	1
Drawing(s)	3 only

10. If you are also filing any of the following, state how many against each item.

**Priority documents**

**Translations of priority documents**

Statement of inventorship and right to grant of a patent (Patents Form 7/77) YES

Request for preliminary examination and search (Patents Form 9/77) YES

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application

Signature

Date: 28 October 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

D M SHAYA 01753 500804

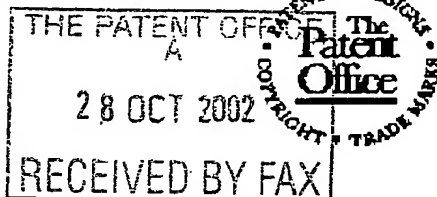
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## Patents Form 7/77

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Statement of inventorship and of  
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The Patent Office

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1. Your reference

P-UK-CS1144

2. Patent application number  
(if you know it)

0224955.5

28 OCT 2002

3. Full name of the or of each applicant

BLACK &amp; DECKER INC

4. Title of the invention

HANDLE ASSEMBLY FOR TOOL

5. State how the applicant(s) derived the right  
from the inventor(s) to be granted a patentBy virtue of employment and in accordance with  
Section 39 of The Patents Act 19976. How many, if any, additional Patents Forms  
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7.

I/We believe that the person(s) named over the page (and on  
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which the above patent application relates to.

Signature

Date: 28 October 2002

D.M. Sj

8. Name and daytime telephone number of  
person to contact in the United Kingdom

DARRIN SHAYA

01753 500804

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Enter the full names, addresses and postcodes of the  
inventors in the boxes and underline the surnames

ANDREW WALKER  
104 CARR HOUSE DRIVE  
NEWTON HALL  
DURHAM  
DH1 5XF  
UNITED KINGDOM

6931992001

Patents ADP number (if you know it):

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Reminder

Have you signed the form?

Patents Form 7/77

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DUPLICATE

**HANDLE ASSEMBLY FOR TOOL**

The present invention relates to handle assemblies for tools, and relates particularly, but not exclusively, to handle assemblies having combined friction gripping and vibration damping properties, for power tools in which an output shaft is driven by a motor.

Known power tools, such as power drills in which a drill bit is rotated by an output shaft which is in turn rotated by means of an electric motor, generate significant amounts of vibration, which can under certain circumstances limit the length of time during which the tool can be used continuously, and may even cause injury to users of the tool. In addition, the housing of such tools is generally made from a durable plastics material on which it can be difficult for a user of the tool to maintain a grip when the tool is in use for a sustained period.

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US 6308378 discloses a gripping arrangement for a handle of a power tool in which the sides of the handle are provided with frictional gripping zones, each side of the handle including a plurality of alternating gripping zones of a softer material and a harder material. The softer material used is generally a thermoplastic elastomer or rubber material, and the harder material is generally the same material as that from which the tool housing is formed.

This known arrangement suffers from the drawback that because the softer material performs the dual functions of providing a friction grip and vibration damping, the choice of material constitutes a compromise in that although it will have acceptable friction reducing and vibration damping properties, the performance of the handle is limited because a material having optimum frictional properties will generally have unacceptable vibration damping properties, and vice versa.

WO02/38341 discloses a grip handle for a hand-held machine tool in which a hand grip is separated from the remainder of the housing by a vibration damping element

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consisting of an inflatable annular air filled cushion. An additional handle is provided which has a tubular grip element surrounding a further annular air cushion.

5 This known arrangement suffers from the drawback that the use of annular air filled cushions makes the tool of complicated construction, which in turn increases the cost of manufacture of the tool.

Preferred embodiments of the present invention seek to overcome the above disadvantages of the prior art.

10

According to an aspect of the present invention, there is provided a handle assembly for a power tool comprising a housing defining a handle and housing a motor for actuating an output member of the tool, the assembly comprising at least one flexible member adapted to be mounted to a surface of the handle of the power tool and  
15 having an engaging portion adapted to be engaged by a hand of a user of the tool, wherein said engaging portion is adapted to retain at least one gaseous vibration damping material between the engaging portion and the surface of the handle.

By providing at least one flexible member having an engaging portion adapted to  
20 retain at least one gaseous vibration damping material between the engaging portion and the surface of the handle, this provides the advantage of enabling the material of the flexible member to be chosen to have the optimum frictional properties to enable a user to maintain a grip on the tool, and the vibration damping material at the same time to have the optimum vibration damping properties, while at the same time  
25 enabling the gaseous vibration damping material of the handle assembly to be held in position by means of a single layer of material, thus enabling the assembly to be manufactured at significantly less cost.

The assembly may further comprise at least one cover plate for location over the or  
30 each said flexible member in position on the surface of the handle.

At least one said cover plate may comprise a respective substantially rigid member having at least one respective aperture for enabling at least part of said engaging portion to protrude therethrough.

- 5 At least one said flexible member may define in use at least one compartment containing at least one said vibration damping material between the engaging means and the surface of the handle.

At least one said vibration reducing material may be air.

10

According to another aspect of the present invention, there is provided a tool comprising:

- a housing;
- a motor within the housing adapted to actuate an output member of the tool;
- 15 and
- a handle assembly as defined above.

Said engaging portion may have an outer surface including at least one material of higher coefficient of friction than the material of the housing of the tool.

20

A preferred embodiment of the invention will now be described, by way of example only and not in any limitative sense, with reference to the accompanying drawings, in which:-

- 25 Figure 1 is a perspective view of part of a housing of a power tool embodying the present invention;

Figure 2 is an exploded perspective view of the partial housing of Figure 1; and

- 30 Figures 3A to 3C are side cross-sectional views of three alternative forms of the handle, flexible sheet and securing plate of Figures 1 and 2.

Referring to Figures 1 and 2, a power tool 1 such as a drill or jigsaw comprises a housing 2 defining an aperture 3 bounded on one side thereof by a handle 4, the housing 2 containing a motor (not shown) for actuating an output member such as a drill bit or jigsaw blade (not shown).

The housing 1 is formed from a generally durable plastics material, as will be familiar to persons skilled in the art, and has a recessed portion 5 on a generally smooth upper surface of the handle 4, the recessed portion 5 being provided with a recess 6 containing an actuating switch (not shown) for turning the tool 1 on and off. The housing 2 is provided with ventilation apertures 7 at one end of the recessed portion 5 to allow cooling of the interior of the housing 2.

A flexible sheet 8, of thermoplastic elastomeric material such as a silicone rubber or a polypropylene and butadiene compound having a coefficient of friction higher than that of the material from which the housing 2 is made, is formed by means of a suitable method such as moulding. The sheet 8 has a periphery shaped to fit inside the periphery of recessed portion 5 to cover all of the recessed portion 5 except that part in which the ventilation apertures 7 are provided, and the flexible sheet 8 is provided with a through-aperture 9 to allow access to the actuating switch in recess 6. The flexible sheet 8 is also provided with a series of protrusions 10, each of which defines an air-filled chamber 16 between the sheet 8 and the upper surface of the handle 4 of the housing 2 when the sheet 8 is placed in position on the upper surface of the recessed portion 5. The flexible sheet 8 may be fixed in position on the housing 2 by means of a suitable welding technique such as heat staking and/or ultrasonic vibration, as will be familiar to persons skilled in the art.

A securing plate 11 of durable plastics material, such as the material from which the housing 2 is constructed, has an internal surface 12 corresponding generally to the external (i.e. upper) surface of the flexible sheet 8. The securing plate 11 is provided with a series of first apertures 13 for allowing the protrusions 10 of the sheet 8 to

AUK:CS1144

protrude therethrough when the plate 11 is mounted to the handle 4 to secure the flexible sheet 8 in place, a second aperture 14 co-operating with the aperture 9 to allow access to the actuating switch in recess 6, and a series of third apertures 15 cooperating with the ventilation apertures 7 in the housing 2.

5

Referring to Figure 3A, a flexible sheet 8, having protrusion 10, is sandwiched between securing plate 11 and recessed portion 5 of handle 4. Protrusion 10 extends through first aperture 13 and along with recessed portion 5 of handle 4 defines air-filled chamber 16.

10

Referring to Figure 3B, in which parts common with the embodiment of 3A are denoted by like reference numerals increased by 100, protrusion 110 is provided with a plurality of resilient ribs 117 extending from an internal surface 118 of protrusion 110 to surface 119 of recessed portion 105. Ribs 117 provide an additional damping by their own resilience and/or by the formation of pockets of air within the air filled chamber 116. Ribs 117 may be formed into a pattern such as parallel lines or concentric rings.

15

Referring to Figure 3C, in which parts common with the embodiment of 3A are denoted by like reference numerals increased by 200, flexible sheet 208 is moulded so as to bond, at junction 220, with securing plate 211. As a result recessed portion 205 is in direct contact with securing plate 211. Ribs of the type shown in Figure 3B may also be included. Sheet 208 and securing plate 211 may be bonded to each other by an over-moulding operation or by the sheet 208 being formed in the second shot in a twin shot injection moulding process.

20  
25

The operation of the handle 4 of the tool 1 of the invention will now be described.

When a user's hand (not shown) grips the tool 1 when in use, the user's hand comes into contact with the securing plate 11 and the protrusions 10 beneath which the air filled chambers 16 are located. As a result, vibrations generated by the motor in the

30

tool housing 2 are damped by the air-filled chambers 16 beneath protrusions 10, and the user's grip on the tool is maintained by contact between the user's hand and the high friction material of the flexible sheet 8. It can therefore be seen that by suitable choice of material of the flexible sheet 8, the frictional properties of the sheet 8 can be optimised, while the vibration damping properties of the air-filled chambers 16 are generally superior to the vibration damping properties of known high friction materials used in conventional handle assemblies.

It will be appreciated skilled in the art that the above embodiment has been described by way of example only, and not in any limitative sense, and that various alterations and modifications are possible without departure from the scope of the invention as defined by the appended claims.

CLAIMS

1. A handle assembly for a power tool comprising a housing defining a handle and housing a motor for actuating an output member of the tool, the assembly comprising  
5 at least one flexible member adapted to be mounted to a surface of the handle of the power tool and having an engaging portion adapted to be engaged by a hand of a user of the tool, wherein said engaging portion is adapted to retain at least one gaseous vibration damping material between the engaging portion and the surface of the handle.
- 10 2. An assembly according to claim 1, further comprising at least one cover plate for location over the or each said flexible member in position on the surface of the handle.
3. An assembly according to claim 2, wherein at least one said cover plate comprises a  
15 respective substantially rigid member having at least one respective aperture for enabling at least part of said engaging portion to protrude therethrough.
4. An assembly according to any one of the preceding claims, wherein at least one said flexible member defines in use at least one compartment containing at least one said  
20 vibration damping material between the engaging means and the surface of the handle.
5. An assembly according to any one of the preceding claims, wherein at least one said vibration reducing material is air.
- 25 6. A handle assembly for a power tool comprising a housing defining a handle and housing a motor for actuating an output member of the tool, the assembly substantially as hereinbefore described with reference to the accompanying drawings.
- 30

7. A tool comprising:

a housing;

a motor within the housing adapted to actuate an output member of the tool;

and

5 a handle assembly according to any one of the preceding claims.

8. A tool according to claim 7, wherein said engaging portion has an outer surface including at least one material of higher coefficient of friction than the material of the housing of the tool.



**ABSTRACT**  
**HANDLE ASSEMBLY FOR TOOL**

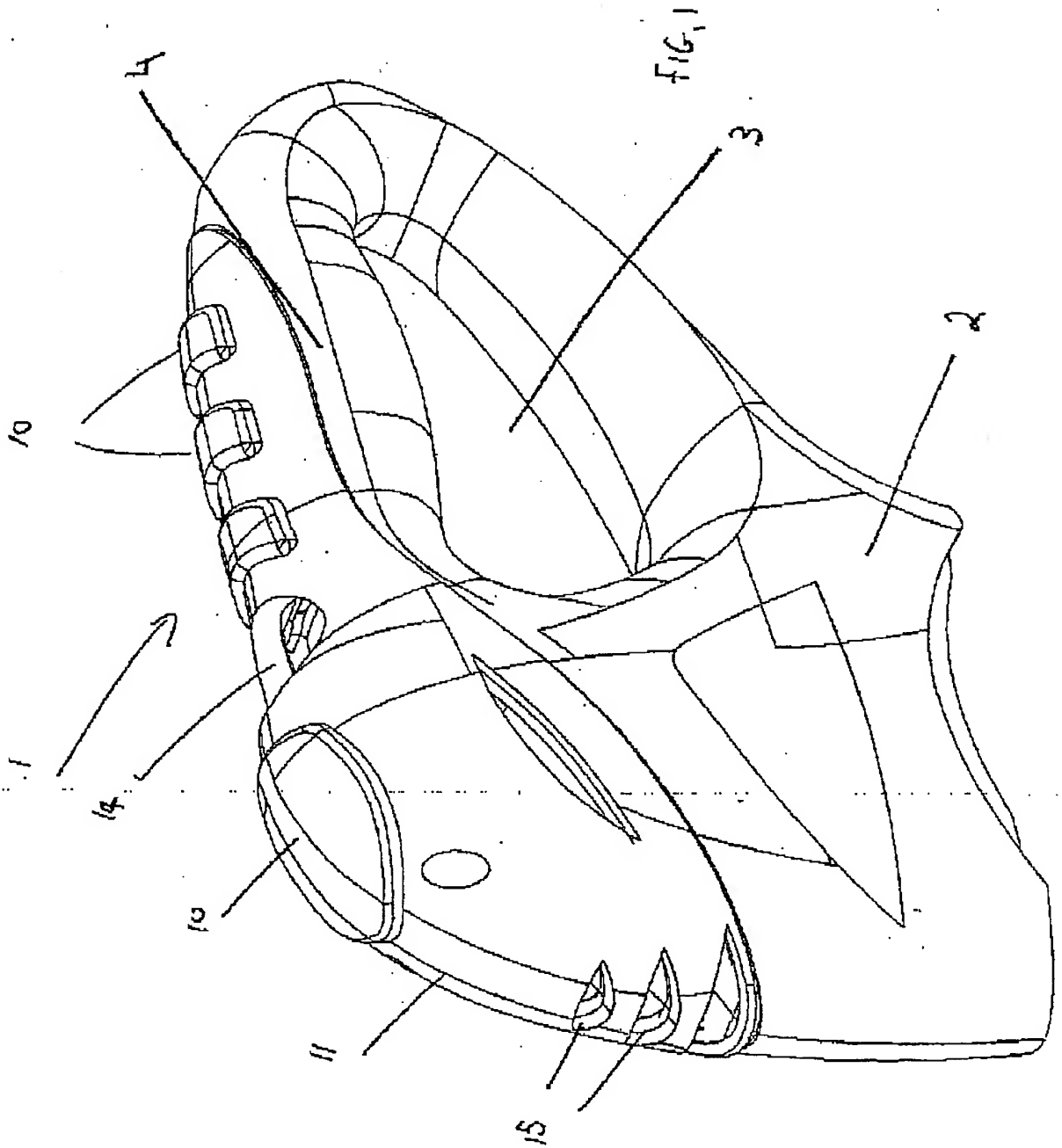
- 5 A handle assembly for a power tool 1 comprises a housing 2 defining a handle 4 and housing a motor for actuating an output member of the tool, such as a drill bit or jigsaw blade. The handle assembly comprises at least one flexible sheet 8 adapted to be mounted to a surface of the handle of the power tool and having a series of protrusions 10 adapted to be engaged by a hand of a user of the tool. The protrusions
- 10 10 retain at least one gaseous vibration damping material such as air between the flexible sheet 8 and the surface of the handle 4.

[Figure 2]

15

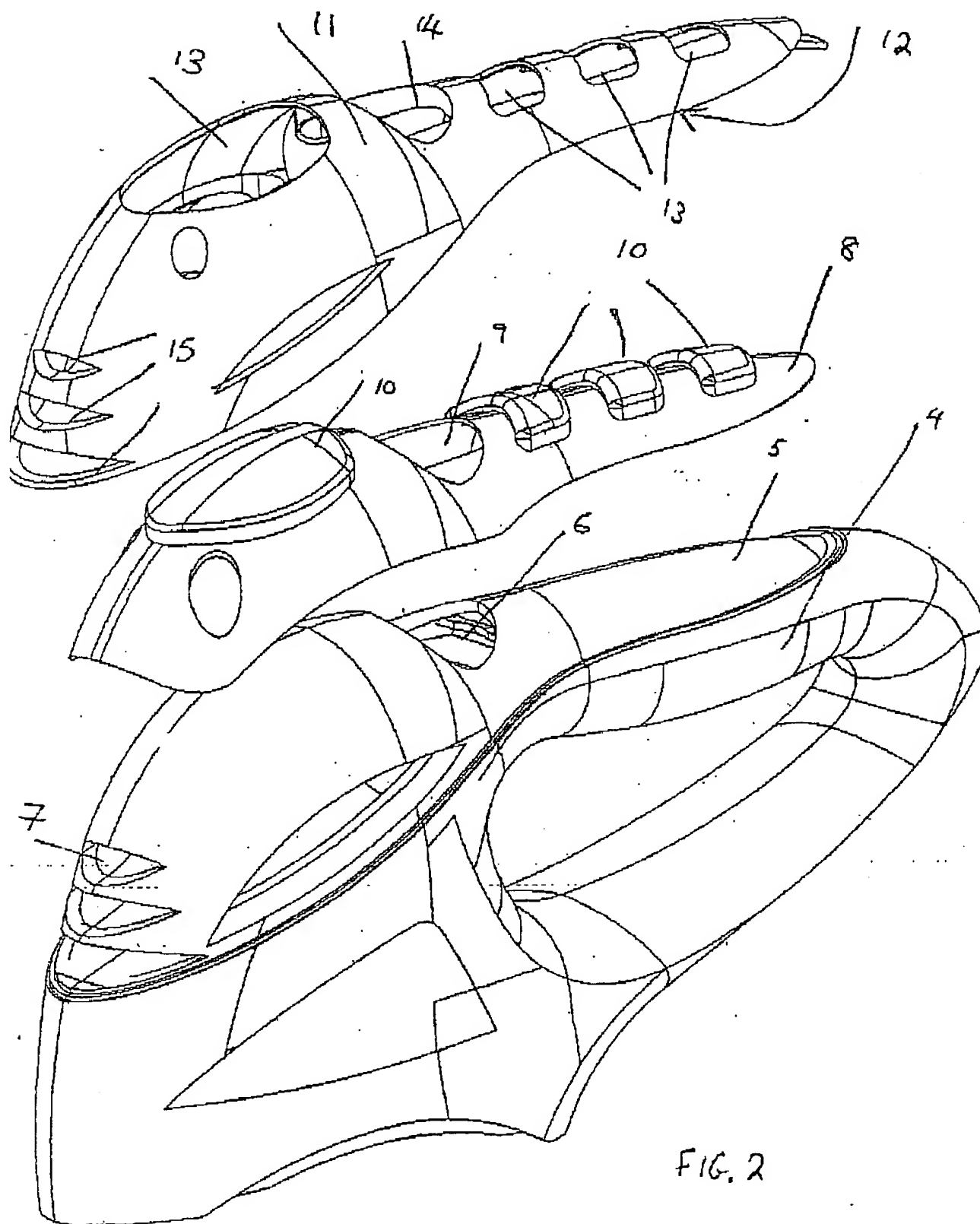


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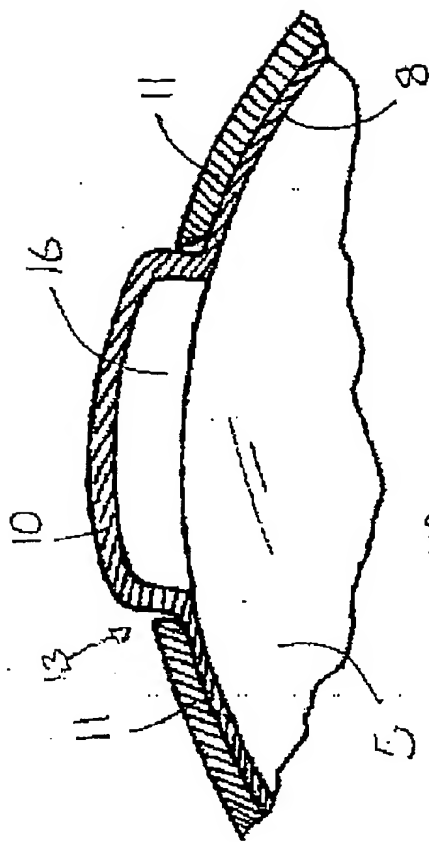


FIG 3A

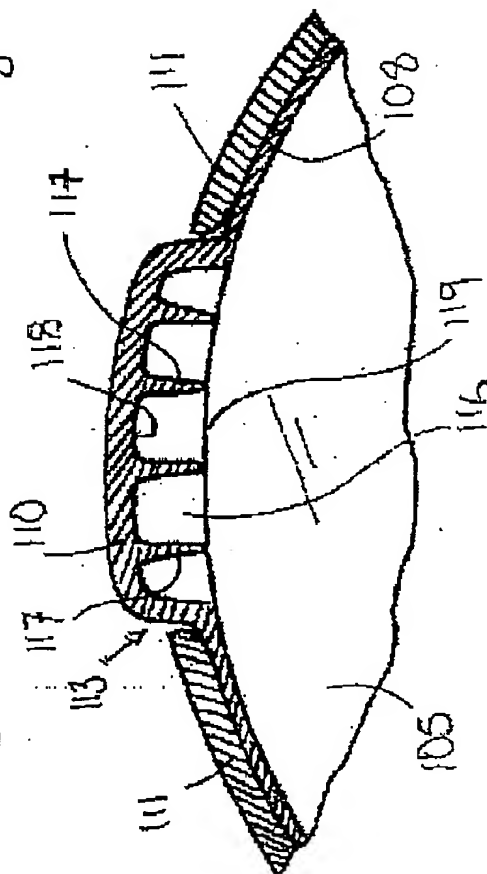


FIG 3B

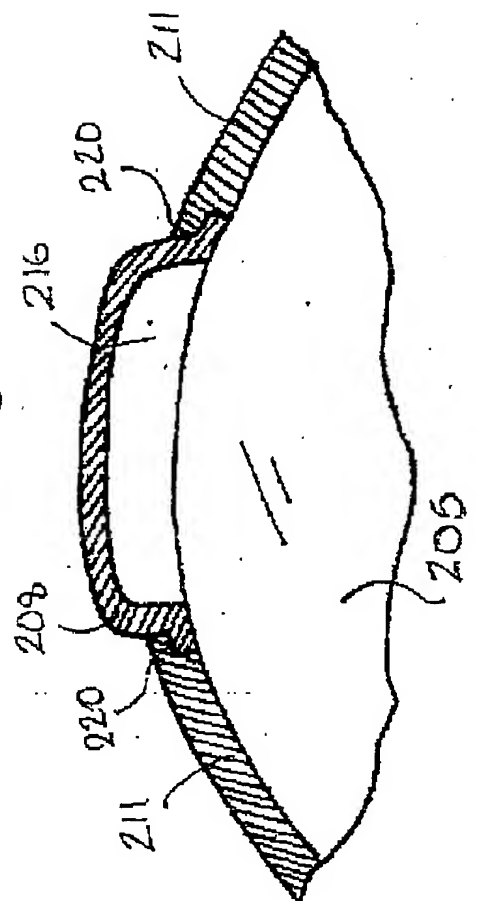


FIG 3C

